## **Claims**

- 1. Method for phenotyping of a human individual comprising determining in vivo protein activity and thereby obtaining a characteristic of said human individual, the determination comprising
  - a) hyperpolarising the NMR active nuclei of samples collected from a human individual preadministered with at least one probe compound containing at least one NMR active nuclei, and
  - b) analysing said samples by NMR spectroscopy.

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- 2. Method according to claim 1 wherein one probe compound containing at least one NMR active nuclei is used.
- 3. Method according to claim 1 wherein more than one probe compound containing at least one NMR active nuclei is used.
  - 4. Method according to claims 1 to 3 wherein the activity of several proteins or isoenzymes is determined and thus a set of characteristics of said human individual is obtained.

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- 5. Method according to claims 1 to 4 wherein the method is carried out for several human individuals and thus characteristics of said several human individuals are obtained.
- 25 6. Method according to claim 5 wherein human individuals who exhibit the same or similar characteristics are grouped.
  - 7. Method according to claim 6 for phenotyping of a clinical trial group
- Method according to claims 1 to 4 wherein said characteristic of said human individual is compared with characteristics of other human individuals, preferably having been obtained according to claim 6, and thereby classifying said human individual into a group.

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- 9. Method according to claim 8 for phenotyping of a human individual prior to said human individual receives therapeutic drug treatment.
- 10. Method according to claims 1 to 9 wherein the at least one probe compound is enriched with NMR active nuclei.
  - 11. Method according to claims 1 to 10 wherein hyperpolarisation is carried out by means of polarisation transfer from a noble gas, brute force, dynamic nuclear polarisation (DNP) or spin refrigeration.

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- 12. Method according to claims 1 to 11 wherein the collected samples are biofluids.
- 13. Method according to claims 1 to 12 wherein the protein activity to be
  determined is the activity of a protein selected from the group consisting of
  NADPH quinone oxireductases, CYP450, N-acetyltransferase, glutathione
  transferase, thiomethyltransferase, thiopurine methyltransferase,
  pseudocholinesterase, sulfotransferase, UDP-glucuronosyl transferase,
  serotonin transport protein, ATP binding cassette (ABC's) and pglycoprotein.
  - 14. Method according to claims 1 to 13 wherein the at least one probe compound is a substrate, inducer or inhibitor for Cytochrome P 450 (CYP450)
- 25 15. Method according to claim 14 wherein the at least one probe compound is a substrate, inducer or inhibitor for a CYP 450 isoenzyme selected from the group consisting of CYP1A2, CYP2A6, CYP2C8/9, CYP2C19, CYP2D6, CYP2E1 and CYP3A4.
- 30 16. Method according to claims 1 to 15 wherein the at least one probe compound is selected from the group consisting of phenacetin, coumarin, tolbutamide, phenytoin, mephenytoin, S-mephenytoin, bufuralol, chlorzoxazone, midazolam, caffeine, dapsone, diclofenac, debrisoquine, bupropion, antipyrine, dextromethorphan, warfarin, diazepam, alprazolam, triazolam,

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flurazepam, chlodiazepoxide theophylline, phenobarbital propranolol, metoprolol, labetalol, nifedipine, digitoxin, quinidine, mexiletine, lidocaine, imipramine, flurbiprofen, omeprazole, terfenadine, furafylline, codeine, nicotine, sparteine, erythromycin, benzoylcholine, butrylcholine, paraoxon, para-aminosalicylic acid, isoniazid, sulfamethazine, 5-fluorouracil, transstilbene oxide, D-penicillamine, captopril, ipomeanol, cyclophosphamide, halothane, zidovudine, testosterone, acetaminophen, hexobarbital, carbamazepine, cortisol, oltipraz, cyclosporin A and paclitaxel.

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